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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/736,900

12/17/2003

Yasuhide Tani

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EXAMINER

BOECKMANN, JASON J

ART UNIT

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3752

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/736,900	<b>Applicant(s)</b> TANI ET AL.	
	<b>Examiner</b> Jason J. Boeckmann	<b>Art Unit</b> 3752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-15, 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16, 17 and 24-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/11/2007</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: It appears that the specification lacks antecedent basis for the terms “a center opening,” and “a pair of outer openings,” of claim 16, line 21 and claim 26, line 12. The examiner believes that the specification refers to these elements as the “uniform area portion” 174, and the “reducing area portion” 172, respectively.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16, 17 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinbeck (6,161,782), in view of Tani et al (7,021,570).

Heinbeck shows a fuel injector comprising: a valve body (21) having an inner wall in which a fuel passage is formed, the inner wall being provided with a valve seat (27); a valve member (20) having a valve (28) coming in contact with the valve seat, the valve member being operative to close the fuel passage when the valve is seated on the valve seat and to open the fuel passage when the valve leaves the valve seat; and an

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injection bore member (30) mounted on an end of the valve body downstream of the valve seat, wherein the injection bore member comprises: first (either 26 or 55) second (60) and third plates (61) and an injection bore plate (60) stacked on top of each other, a space (53) formed between the bottom of the valve body and the second plate operatively communicated with the fuel passage, so that fuel is supplied into the space when the fuel passage is opened; a guide passage, or control opening (66) having a center opening (68) and a pair of outer openings (80), the center opening being arranged at a center of the injection bore member and the outer openings being connected to the center opening and arranged at radial outer sides of the center opening; a pair of through-holes (67) formed in the second, plate for communicating the space with the respective outer openings of the guide passage, so that the fuel flows from the space into the outer openings of the guide passage through the respective through-holes; and an injection bore (69), formed in the injection bore plate, an inside end of which being opened to the center opening of the guide passage, wherein each of the through-holes, of the second plate, being arranged at such a position, which is on an outer side of the injection bores in a radial direction, so that the fuel supplied into the outer openings flows toward the injection bores in radial and inward directions from each of the outer openings. Heinbeck does not specifically disclose that there are multiple injection bores in the injection bore plate.

However, Tani et al. shows a fuel injector similar to that of Heinbeck including a valve body (30) a valve seat (224), a valve member (42) and an injection bore plate (228), and the injection bore plate having a plurality of injection bores (229). Tani et al.

also teaches that the number of injection bores will depend on the mist configuration that is desired, (column 10, lines 15-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to add at least one more injection bore to the injection bore plate (62) of Heinbeck, in order to allow the fuel injected through the injection bores to form the right mist configuration, As taught by Tani et al. (column 10, lines 15-25).

Regarding claim 17, the outer openings have a reducing area portion (the area reduces as the fuel goes from the hole 80 to the passage 66) and the center opening has an enlarging area portion (the area increases as the fuel flows from the passage 66 to the center opening 68).

Regarding claim 24 and 25, the outer openings are defined at opposite sides of the center opening and outer openings are near fan shaped with an outwardly flaring section (the cross section flares out when the passage 66 reaches the hole 80), and the center opening would be generally octagonal in shape if eight injection hole were used to produce the desired mist configuration.

Claims 16, 17 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinbeck (6,161,782), in view of Fuchs et al. (6,170,763).

Heinbeck shows a fuel injector comprising: a valve body (21) having an inner wall in which a fuel passage is formed, the inner wall being provided with a valve seat (27); a valve member (20) having a valve (28) coming in contact with the valve seat, the valve member being operative to close the fuel passage when the valve is seated on the

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valve seat and to open the fuel passage when the valve leaves the valve seat; and an injection bore member (30) mounted on an end of the valve body downstream of the valve seat, wherein the injection bore member comprises: first (either 26 or 55) second (60) and third plates (61) and an injection bore plate (60) stacked on top of each other, a space (53) formed between the bottom of the valve body and the second plate operatively communicated with the fuel passage, so that fuel is supplied into the space when the fuel passage is opened; a guide passage, or control opening (66) having a center opening (68) and a pair of outer openings (80), the center opening being arranged at a center of the injection bore member and the outer openings being connected to the center opening and arranged at radial outer sides of the center opening; a pair of through-holes (67) formed in the second, plate for communicating the space with the respective outer openings of the guide passage, so that the fuel flows from the space into the outer openings of the guide passage through the respective through-holes; and an injection bore (69), formed in the injection bore plate, an inside end of which being opened to the center opening of the guide passage, wherein each of the through-holes, of the second plate, being arranged at such a position, which is on an outer side of the injection bores in a radial direction, so that the fuel supplied into the outer openings flows toward the injection bores in radial and inward directions from each of the outer openings. Heinbeck does not specifically disclose that there are multiple injection bores in the injection bore plate.

However, fuel injectors with multiple injection bores in an injection bore plate are well known in the art. For example, Fuchs et al. shows a fuel injection bore plate (36) including multiple injection bores (39).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention make the injection bore plate of Heinbeck's invention with multiple injection bores similar to that of Fuchs et al. This modification would yield the predictable result of spraying fuel into different areas of the cylinder rather than just the center of the cylinder.

Regarding claim 17, the outer openings have a reducing area portion (the area reduces as the fuel goes from the hole 80 to the passage 66) and the center opening has an enlarging area portion (the area increases as the fuel flows from the passage 66 to the center opening 68).

Regarding claim 24 and 25, the outer openings are defined at opposite sides of the center opening and outer openings are near fan shaped with an outwardly flaring section (the cross section flares out when the passage 66 reaches the hole 80), and the center opening would be generally octagonal in shape if eight injection holes were used to produce the desired mist configuration.

### ***Response to Arguments***

Applicant's arguments with respect to claims 16, 17 and 24-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason J. Boeckmann whose telephone number is (571)272-2708. The examiner can normally be reached on 8:00- 5:00, Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Len Tran can be reached on (571) 272-1184. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. J. B./

Examiner, Art Unit 3752

5/2/2008

/Len Tran/

Supervisory Patent Examiner, Art Unit 3752